EPA Region 7 TMDL Review

TMDL ID	196	*Water Body ID*	MT1-L0050
Water Body Name	Zorinsky Lake		
Pollutant	Siltation/Sedimentation		
Tributary	Box Elder Creek		
State	NE *HUC*	10230006	
Basin	Missouri River		
Submittal Date	09/23/2002		
Approved	yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter and package received 9/23/02.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Nebraska's Aquatic Life-Warmwater Class A and Aesthetics beneficial uses are identified as not attained due to excessive sedimentation. Nebraska does not have numeric criteria for sediment or total suspended solids but NDEQ has adopted methods to evaluate the severity of sedimentation in reservoirs using volume loss as an indicator. Beneficial uses are considered to be in attainment when the amount of annual volume loss/sedimentation in a lake or reservoir is less than 0.5%. The loading capacity is identified as 5,000 tons/year; an 83% reduction in the current load (approximately 30,000 tons/year) is necessary to meet the load capacity and associated volume loss indicative of water quality standards (WQS) attainment.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

All beneficial uses are described as well as the applicable narrative criteria. The TMDL is based on narrative criteria translated to a numeric water quality target. Annual volume loss targets in comparison with current sediment load estimates allowed for the determination of the desired endpoint and the associated degree of sediment load reduction needed to attain beneficial uses. The lake's current sediment load and loading capacity was determined through the use of bathymetric survey data and the EUTROMOD watershed and lake modeling software (Reckhow 1990) respectively.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The lake was identified on the 303(d) list as impaired because of the severity of the sedimentation rate occurring in the lake's multi-purpose pools (east and west basins). Therefore, the targeted endpoint is translated as the amount of sediment the lake can receive on an annual basis and still meet an average annual multi-purpose pool loading rate of <0.40%. In order to reach the goal of less than 0.40% volume loss/year, approximately 24,500 tons/year of sediment needs to be reduced. Existing information (storage capacities) and monitoring data were used as a verification for the modeled sediment load predictions.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

There are no point sources of sediment in the watershed. Nonpoint sediment source identification and quantification was completed through application of the EUTROMOD universal soil loss equation and field reconnaissance surveys. Construction areas were found to be the largest single contributor of sediment at 15,602 t/yr, agricultural row crops are the next largest at 6,928 t/yr, and streambank and gully erosion contributed 5,000 t/yr.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Allocation is based on loading to the West Basin, and that portion of which passes through to the East Basin of Zorinsky Lake. The loading capacity is 5,000 t/yr sediment.

WLA Comment

The WLA is zero.

LA Comment

The LA is identified as 5,000 tons/year of sediment.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The MOS is implicit based on conservative assumptions (worst case scenarios) used in the modeling of sediment loads, and the assumption that all sediment delivered is deposited in the multi-purpose pool rather than any losses occurring through the outlet of the lake.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

The Universal Soil Loss Equation used in the modeling efforts applied average "spring season" (critical conditions) values for soil and climatic conditions. However, there are no specific critical conditions associated with this TMDL because once sediment settles in the lake, it is assumed to have an infinite residence time and is present on a year round basis.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

The draft TMDL was announced through public notices in the Lincoln Journal Star and Omaha World Herald Newspapers with a 60-day comment period provided. The TMDL was also made available on the NDEQ website and announcement letters were mailed to identified stakeholders. All aspects of the TMDL were also brought to attention of the stakeholders through the Community Based Watershed Management Process.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

The USACE has agreed to conduct annual monitoring and forward the results to NDEQ for assessment. The USACE will also conduct periodic bathymetric surveys. NDEQ will periodically conduct monitoring to evaluate the effectiveness of BMPs.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

Although reasonable assurances are not required for this TMDL, Nebraska has identified several Federal, State, local, and non-government organizations that may be included in the implementation process.

EPA Region 7 TMDL Review

TMDL ID	197	*Water Body ID*	MT1-L0050
Water Body Name	Zorinsky Lake		
Pollutant	Organic Enrichment/Low Dissolved Oxygen (DO)		
Tributary	Box Elder Creek		
State	NE	*HUC*	10230006
Basin	Missouri River		
Submittal Date	09/23/2002		
Approved	yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

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Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Nebraska's Aesthetics and Warmwater A Aquatic Life uses are identified as not attained due to excessive nutrients causing excursions of Nebraska's Water Quality Standard (WQS) numeric criterion for dissolved oxygen (DO) manifested by the hypereutrophic condition in the lake. Nebraska does not have numeric criteria for nutrients, however, the Carlson's trophic state index (TSI) was used as an assessment tool for determining beneficial use attainment in lakes. Beneficial uses are considered to be in attainment when 2 of 3 TSI parameters (secchi depth, phosphorus and chlorophyll-a (chl-a)) are less than 60 with an overall mean not to exceed 60. The targeted in-lake water quality conditions resulting from the identified phosphorus allocations will result in the lake fully supporting the aesthetic beneficial use.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

All beneficial uses are described as well as the applicable numeric and narrative criteria. The TMDL is based on the numeric criterion for DO which is a 1-day minimum of 5.0 mg/L, applicable from April 1 to September 30, and the narrative criteria for aesthetics which is translated to a numeric chl-a water quality target through the use of targeted TSI scores and modeling. The lake's current phosphorus load and loading capacity was determined through the use of the EUTROMOD watershed and lake modeling spreadsheet. Although the lake is currently light-limited, phosphorus was selected as the nutrient/parameter of concern because past monitoring has indicated eastern Nebraska lakes to be phosphorus limited and the lake exhibits similar phosphorus concentrations as which occur in other Nebraska eastern lakes. There is a concurrent siltation/sediment TMDL for Zorinsky Lake.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

In-lake conditions indicate accelerated eutrophication/algal growth and low DO concentrations caused by excessive nutrient loading; this linkage between accelerated eutrophication and water quality impairments has been repeatedly documented. The EUTROMOD model was used to estimate annual phosphorus loads from the watershed and in-lake monitoring data was used to calibrate the EUTROMOD model, define the loading capacity, current load and the in-lake response predictions. The loading capacity is identified as 3,130 pounds/year phosphorus for the West Basin, and 1,680 pounds/year (passed from the West Basin) for the East Basin. A 73% reduction in the current phosphorus load (8,614 pounds/year) to the West Basin is necessary to meet the load capacities for both basins and ultimately achieve water quality standards attainment.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

There are no point sources of phosphorus in the watershed. Nonpoint phosphorus source identification and quantification was completed through application of the EUTROMOD which was calibrated using in-lake phosphorus concentration data. Construction areas were found to be the largest single contributor of phosphorus at 8,152 pounds/yr, followed by agricultural row crops at 3,152 pounds/yr.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Allocation is based on phosphorus loading to the West Basin, and that portion of which passes through to the East Basin of Zorinsky Lake (and includes the phosphorus loading from the East Basin watershed).

WLA Comment

The WLA is zero.

LA Comment

The LA is identified as 3,130 pounds/year phosphorus.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The MOS is implicit based on the assumption that all phosphorus delivered is maintained in the lake and available for algae production rather than any losses occurring through the outlet of the lake.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

The modeling efforts applied seasonal changes and climatic conditions. An annual loading period was used in modeling the lake assimilative capacity and for estimating the loading reduction necessary to meet in-lake water quality targets.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

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Reasonable assurance

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Although reasonable assurances are not required for this TMDL, Nebraska has identified several Federal, State, local, and non-government organizations that may be included in the implementation process.